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An artificial intelligence model to simulate strip flatness in a tandem cold rolling mill

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An Artificial Intelligence Model to Simulate Strip Flatness in a Tandem Cold Rolling Mill

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DECLARATION

This is to certify that the work presented in this thesis was carried out by the author in the school of Mechanical, Materials and Mechatronic Engineering, University of Wollongong, Australia, and has not been submitted for a degree to any other university or institute.

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ABSTRACT

Strip flatness is a very important quality criterion in the cold rolling process. The ability to control flatness more accurately either by conventional methods or new techniques is becoming increasingly important.

This study aims to develop a simple, practical model to simulate cold rolling and embody the fuzzy logic flatness control through mechanical and coolant control devices. For this research a high dimensional data set from a cold rolling mill was captured and analysed, and neural networks were applied to predict strip flatness. Preliminary results show that the proposed scheme has the potential to increase accuracy in predicting flatness. Mechanical and thermal actuators combined with fuzzy logic control rules have been developed to achieve the flatness control.

The parameters were optimised to determine the material resistance and coefficient of friction simultaneously and a simplified friction equation has been proposed.

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PUBLICATIONS

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